

Remarks

Claim Objections

Applicant has amended claim 3 to make it clear that one function of the control means structure is to a) determine volume elements in the fluid layer and b) use X-ray attenuation experienced by the volume elements to form the scan data set. This functional requirement of the control means limits the apparatus structure of claim 1.

Claim Rejections Under 35 U.S.C. Section 102

Examiner has rejected all pending claims as being anticipated by U.S. Patent No. 4,866,745. The '745 Patent discloses a generic CT scanner that claims to be capable of measuring the flow pattern in a multiphase flow inside a pipe. See Col.2:30-32. Beyond these general statements, the '745 Patent does not, however, disclose any specific methods of achieving this result. Figure 6 represents an image of pipes, not fluid, taken by the CT scanner.

By contrast, at least one objective of the claimed embodiments of the present invention is to monitor fluids in a mixture and, more specifically, to identify volumes of different liquids mixed together in the same fluid and monitor the movement of each of those different, separate liquids. For example, “[t]o optimize the production process, it is necessary to know the fraction of oil and water in the liquid phase and also to know the volumes of oil and water produced by each well in the field”. The '745 Patent does not claim to be directed to this specific objective, nor does it disclose a system that could effectively achieve this result.

To translate this functional difference between the present invention and the cited art into the claims, Applicant has amended the independent claims to make it clear that the X-ray scanner used in the present invention “comprises a sensor array having at least two image rings, each of said image rings arranged serially along an axis of flow”. This structural element allows for the effective monitoring of fluids in a mixture, identification of volumes of different liquids mixed together in the same fluid, and monitoring the movement of each of those different, separate liquids. The '745 Patent does not disclose such a structure. This limitation is just one of several ways of differentiating the structures disclosed in the '745 patent from the present application.

Regarding the dependent claims, Applicant notes that Examiner's rejections are broadly worded and difficult to address. Applicant has been unable to identify where the '745 Patent

discloses the limitations of at least claims 3-9, 12, 20-26, and 29-31. As such, Applicant maintains that, even without amending the independent claims, those claims, if rewritten in independent form, would be patentable. Applicant has made amendments to the dependent claims to clarify the scope and meaning of the claimed limitations and added dependent claims 35-41 that further limit the claimed apparatus.